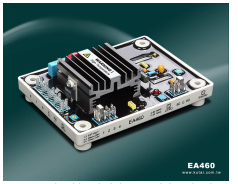
EA460

Self Excited Automatic Voltage Regulator 120V or 240V

Compatible with Newage* Stamford SX460 regulator



Features

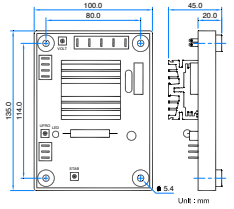
- Voltage regulation < +/- 1%
- Soft start voltage ramping
- Sensing voltage loss protection
- 120 or 240 Vac sensing, jumper selectable
- Under frequency roll off protection
- With under frequency LED indicator

*All manufacturer names, numbers, symbols and descriptions are used for reference purpose only and do not imply that any part is the product of these manufacturer.

Specifications

Sensing Input	Voltage 120 (95-132) or 240 (190-264) Vac		**External Volts Adjustment**	+/- 7% with 1K ohm 1 watt trimmer	
	1 phase 2 wire jumper selectable		**Unit Power Dissipation**	Max. 10 watts	
	Frequency 50 / 60 Hz jumper selectable		**Soft Start Ramp Time**	2 sec.	
Output	Voltage Max. 90 Vdc at 207 Vac input		**Under Frequency Protection**		
	Current Continuous 4A			Set Point	95% Hz (Factory Knee Point Setting)
	Intermittent 10A for 10 sec.			Slope	170% down to 30 Hz
	Resistance Min. 15 ohms		**Environment**	Operation Temperature	-40 - +70 °C
Volts Regulation	< +/- 1% (with 4% engine governing)			Storage Temperature	-40 - +85 °C
Build Up Voltage	Residual volts at AVR terminal > 5 Vac			Relative Humidity	Max. 95%
Thermal Drift	0.05% per °C change in AVR ambient			Vibration	3.3Gs @ 100-2K Hz

Mechanical Specifications



AVR Control Function

VOLT	Voltage adjustment
STAB	Stability adjustment
UFRO	Setting under frequency protection knee point

Physical Specification

Dimensions	135.0 (L) x 100.0 (W) x 45.0 (H) mm
Weight	243 g +/- 2%

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www.setecom.com for detailed manual

1. SPECIFICATION

Sensing Input
Voltage 95 ~ 132 VAC or 190 ~ 264 VAC
1 phase, jumper selectable
Frequency 50 / 60 Hz, selectable

Output
Voltage Max. 90 VDC @ 207 VAC
Current Continuous 4A
Intermittent 6A for 10 sec.
Resistance Min. 15 ohm

Voltage Regulation
< ± 1.5% (with 4% engine governing)

Voltage Build-up
Residual voltage at AVR terminal > 5 VAC

Thermal Drift
0.05% per ˚C change in AVR ambient

External Volts Adjustment
±7% with 1K ohm 1 watt trimmer

Unit Power Dissipation
Max. 10 watt

Under Frequency Protection
Set point 95% Hz

(UFRO)
Slope 170% down to 30 Hz

Soft Start Ramp Time
2 sec.

Dimensions
135mm L * 100mm W * 49mm H

Weight
243g ± 2%

2. WIRING (Refer to Figure 4)

1. Connect F1, F2 to DC output port.
2. Connect the sensing port at 7, 8 (the factory setup is 220V, if 110V is required, please join 3, 4)
3. External voltage regulator is as Figure 4.
4. Connect a jumper from COM to the 50Hz terminal for 50Hz operation.

Note :

Please install 5A 250V fuse at power input port as Figure 4.

3. NOTICE OF USE

3.1 See Figure 1

1. The connection and examination procedures must be executed by the profession engineers.
2. Place the EA460 inside of the generator, especially the moisture-proof and anticorrosive space.

3.2 Startup Procedure

1. The surface temperature pf the EA460 will be over 60 ˚C.
2. When operations, please do not touch the warning signal of the heat sink.

3.3 System Startup

1. Ensure all the wire of the regulator are correctly connected and the proper fuse (5A250V) is installed.
2. Turn voltage potentiometer full anticlockwise (lowest voltage level).
3. If used, turn external voltage potentiometer to the middle position.
4. Turn stability potentiometer full clockwise (highest stability level).
5. Connect a 110VDC meter across the field with proper polarity.
6. Connect a 300VAC meter across line to neutral of generator.
7. Start and run the generator at no load and rated speed. The generator output voltage should build up to a minimum level if the voltage does not build up, It may cause by low residual voltage of generator. Refer to field flashing section in generator manual.
8. Slowly adjust voltage potentiometer until the generator voltage reach the proper value.

9. Turn the stability potentiometer clockwise until instability is shown, and then turn it anticlockwise slightly still both meter mention in (5) and (6) shown stable.
10. Interrupt regulator power for a short time (approximately 1 to 2 second). If the voltage still stable, the adjustment is now completed. Otherwise increase the stability slightly, repeat procedure (10) until stability is reached.

4. ADJUSTMENTS

4.1 Frequency Roll-off Adjustment

- As using 50Hz, please connect a jumper between Com and 50Hz. As 60Hz, between Com and 60 Hz.
- To reset the frequency roll-off, proceed as follow :

1. Startup engine and build voltage.
2. Adjust the engine speedy down to low frequency.
3. Adjust the front panel U/F control until the output voltage low about 5V than nominal voltage. (For 50Hz applications, the frequency "Roll-off" is factory preset to 45Hz, for 60Hz operation, the frequency is 55Hz).

4.2 Voltage Adjustment

1. Adjust the front panel VOLT to vary the generator nominal voltage.
2. If used, a 1000 ~ 1500Ω 1/2 watt potential meter may be connected to terminals VR and VR, refer to Figure 4.

4.3 Stability Adjustment

1. Adjust the front panel STAB control the system stable. Rotation of the front panel STAB control in the counter-clockwise (CCW) direction will speed response time. If rotated too for CCW, the generator voltage my oscillate (hunt).
2. Rotated the front panel STAB control CCW until the system start oscillating and then rotate cw just past the point where oscillation occurred.

5. FIELD FLASHING

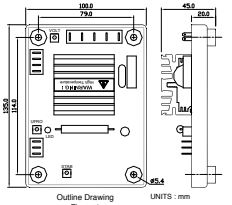
When the regulator is operated with the generator for the first time, the polarity of residual magnetism may be reversed or too small to achieve the necessary build-up voltage for the regulator. If reversing the field connections does not induce build-up, and the residual voltage is less than the specified value of 5 VAC, shut down the Prime-mover and proceed with the following steps :

1. With the Prime-mover at rest and the regulator's field output wires disconnected, apply a DC source (NOT grounded) of no more than 3~12 VDC with Positive to F+ and Negative to F-, in series with a current-limiting resistor of 3~5 ohms 20 watt. (The set battery is a suitable source.)
2. Allow approximately 3 seconds before removing the DC source.
3. Disconnect the AVR AC power input terminals and restart the generator, re-measure the residual voltage. If this voltage is greater than 5VAC, reconnect voltage regulator, and voltage build-up should be successful. If measured less than 5VAC, repeat steps 1 and 2.
4. If residual voltage is greater than 5VAC, but AVR still unable to build up voltage, please replace with another AVR.

WARNING

Overly field flashing may damage the AVR or generator excitation winding.

Please make sure you have read and understand the contents of the instruction manual prior to installation. Incorrect wiring connection may result in irreversible damage to the product and other equipments.

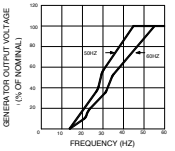


Outline Drawing
Figure 1

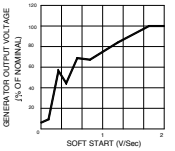
UNITS : mm

ATTENTION

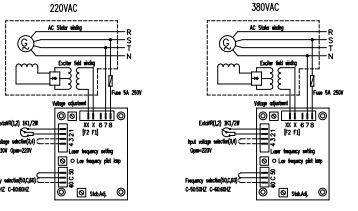
1. AVR can be mounted directly on the engine, genset, switchgear, control panel, or any position that will not affects operation. For dimension reference, please see Figure 1.
2. All voltage readings are to be taken with an average-reading voltmeter Meggers and high-potential test equipment must not be used. Use of such equipment could damage the AVR.



Frequency Compensation Curves
Figure 2



Soft Start Curve
Figure 3



Wiring and adjustment
Figure 4

Note :

1. When there is no connection to VR, 1 and 2 must be joined.
2. When LED lamp is light on, it means the frequency isn't enough ,The output voltage will decrease to prevent over load exciting current to damage the exciter field winding.

6. TROUBLE SHOOTING

SYMPTOM	CAUSE	CORRECTION
Voltage does not build up	Residual voltage below 5VAC	Flash generator field with proper method
	Incorrect wiring	Check wiring diagram for proper connection
	Power/sensing or field wires not connected	Connect the wires properly
	Generator not up to speed	Increase generator speed
Out voltage low	Poor adjustment is made	Read start procedure carefully and adjust again
	Frequency roll-off	Increase generator speed
	Incorrect voltage selection	Read user's manual to select correct voltage
Out voltage high	Poor adjustment is made	Read start procedure carefully and adjust again
	Incorrect voltage selection	Read user's manual to select correct voltage
Out voltage instable	Poor adjustment is made	Read start procedure carefully and adjust again
	Field voltage requirement lower the rang of regulator	Inquire our distributor to solve

※ Use only original supplied spare protection fuse for fuse replacement.

※ Please accept our sincere apology if any modification in performance, specification or appearance is made without prior notice.